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— Scribner & Welford have just imported a unique example of book-making in the "Mulum in Parvo Atlas of the World." It contains ninety-six double-page maps, a large amount of statistics, and an index covering over one hundred pages, all in shape and size for the pocket. They have just ready a volume of poems and translations by W. J. Linton, the well-known engraver. He privately published, before this, two volumes of poems, both in very limited editions, and now very scarce. In this volume nearly all the poems in those two volumes are included; and, besides new poems, a number of new renderings of French poems, in the original metres, are included.

— Roberts Brothers announce for early publication the second volume of Renan's "History of the People of Israel," covering the period from the reign of David to the capture of Samaria, 721 B.C.; and "French and English," a comparison between these great nations in literature, science, and art, by Philip Gilbert Hamerton.

— Macmillan & Co. will act as the American agents of Sonnenschein & Co.'s new Library of Philosophy. This library is to consist of a series of works edited by J. H. Muirhead, and arranged in three departments, dealing respectively with schools of philosophers, the history of thought in particular departments, and the subject-matter of philosophy treated from an original point of view. In the first series, which will, it is expected, ultimately cover the entire history of thought in the fields of metaphysics and ethics, the following volumes have already been promised: "Sensationalists: Locke to Mill," by W. S. Hough of Ann Arbor, Mich.; "Modern Realists: Leibnitz to Lotze," by Professor Andrew Seth of St Andrew's; "Early Idealists: Descartes to Leibnitz," by W. L. Courtney of New College, Oxford; "Scientific Evolutionists: Comte to Spencer," by Professor John Watson of Kingston, Canada; "Utilitarians: Bentham to Contemporary Writers," by W. R. Sorley of Trinity College, Cambridge; "Moral Sense Writers: Shaftesbury to Martineau," by Professor William Knight of St. Andrew's; and "Idealistic Moralists: Kant to Green," by Professor Henry Jones of University College, Bangor, Me. Of the volumes of the second series, already arranged for, may be mentioned a "History of Logic," by Professor George S. Morris of Ann Arbor, Mich.; "History of Psychology," by Professor Adamson of Owens College; "History of Political Philosophy," by D. G. Ritchie and J. H. Muirhead; "History of Economics," by Dr. J. Bonar; "History of Æsthetics," by A. Bosanquet; and "Evolution of Theology," by Professor Otto Pfeleiderer. As an introduction to the library, Erdmann's (smaller) "History of Philosophy," in three volumes, has been translated by Dr. W. S. Hough of Ann Arbor, Mich., and will appear very shortly.

— Macmillan & Co. have just ready F. Marion Crawford's latest novel, "Greifenstein," the scene of which is laid in South Germany, principally in the Black Forest. Some charming bits of German university life are given.

— D. Appleton & Co. have just ready "The History of Ancient Civilization," a handbook based upon M. Gustave Ducoudray's "Histoire Sommaire de la Civilization," a recent French work that has been highly commended by European critics, edited, revised, and extended by Rem. J. Verschoyle. The second part of the work, treating of modern civilization, will appear shortly. They have also just ready "The Ladies' Gallery," by Justin McCarthy and Mrs. Campbell-Praed, in their Town and Country Library.

— Almost the only new English poet who has won a way into American magazines in the past two or three years is Mrs. Graham R. Tomson, a collection of whose verse is about to be issued by Longmans, Green, & Co., almost at the same time that they publish Col. Higginson's poems. Mrs. Tomson's book is called "The Bird-Bride, a Volume of Ballads and Sonnets." The title "ballad" is of interest to Americans, in that it is an Eskimo legend.

— In the May issue of *The Chautauquan*, Professor J. A. Harrison of Washington and Lee University discusses "Physical Culture in Ancient Greece;" Thomas D. Seymour of Yale University writes on "Demosthenes," the eighth in the series of Greek biographical sketches; Russell Sturgis has a paper on "The Archæ-

ologist in Greece;" the Rev. J. G. Wood, the eminent English naturalist, gives the first of a two-part paper on "Odd Fishes;" Charles Barnard writes of "The Social and Economic Effects of Railroads;" Helen Campbell discusses "The Child and the Community;" "Internal Improvements" is the subject of an article by Franklin H. Giddings of Bryn Mawr College; John Burroughs writes on "Lovers of Nature;" Professor Charles J. Little of Syracuse University considers "The Paris Mob and its Achievements;" an article on "Queer Uses of Words" is from the pen of Rebecca Hart; a sketch of the Russian general, Loris-Melikof, is translated from the *Revue des Deux Mondes*; Dr. H. C. Adams of Michigan University explains the nature and use of "National Bank Notes;" and Charles Frederick Holder closes the list of contributed articles with an account of "The Early Californians."

LETTERS TO THE EDITOR.

*.*Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.

The editor will be glad to publish any queries consonant with the character of the journal.

Twenty copies of the number containing his communication will be furnished free to any correspondent on request.

The Robinson Anemometer.

IN concluding my share in the discussion of this question, I wish to show that it looks now as though Professor Marvin and I have been considering the same resultant effect in the anemometer problem, but from different standpoints. If we place an anemometer on a whirler in a free wind, it is easy to see that the wind must have, relatively, a constant effect in all portions of the rotation. If the wind is double the velocity of the whirler, the resultant effect will be due two-thirds to it and one-third to the whirler; if the two are equal, each will produce half the effect; and so on. This effect has an actual continued increase during half a rotation, and an equivalent diminution during the remaining half: therefore it seems plain that the momentum acquired by the cups during half the rotation of the whirler would be balanced by that lost during the other half.

Viewed from the standpoint of the free wind effect, however, we see an entirely different condition. In computing the anemometer factor, it has been customary to regard the motion of the whirler as entering in its entirety in every rotation, and the whole resultant effect of both whirler and wind on the anemometer has been combined with that. In consequence the total effect differs with each relative motion of whirler and wind. For example: if the wind is double the whirler velocity, there is an increase above the motion due to the whirler during the whole of its rotation, and a total increase in the effect, due to the wind, of about 100 per cent; if the two are equal, there is an increase for two-thirds of the whirler rotation, with an increase of over 25 per cent in the effect due to the wind; if the wind is half the whirler, the increase continues through about 59 per cent of the rotation, with an increase in the resultant of 10 per cent; and so on. If we add to this the effect of whirls in the air, the low results found in England seem to be accounted for.

It seems to be pretty well proved that heavy cups, from their momentum, do not run ahead of lighter cups in an intermittent wind; and even if they did, their resultant motion would not be increased on a whirler. There is good evidence, that, at least at a low velocity of the whirler, the direct effect of the free wind accounts for the very low anemometer factor found therein.

H. A. HAZEN,

Washington, D.C., April 15.

Surveys, their Kinds and Purposes.

WILL you kindly permit me space to criticise some of the conclusions reached by Mr. Marcus Baker, in the paper on "Surveys, their Kinds and Purposes," published in your issue of Nov. 30, 1888? The classification of surveying work is becoming more important every day, in view of the greater interest the States are

taking in the preparation of working maps of their territories, and the extensive surveys that have been authorized by the general government. Any thing, therefore, that will tend to bring about a better understanding of general terms should be hailed as a step in the right direction. Mr. Baker presents one view of the subject in a forcible manner, but it seems to me far from satisfactory.

The title of the paper fairly justifies the impression that the author intended to classify surveys which result from the practical application of the science and art of surveying; and, indeed, the subjects enumerated in the second and third of his "great divisions" bear out the inference. In the "first division," however, which includes all surveys for general purposes in its broad scope, he fails to mention many kinds which he might include, unless he is willing to restrict the word "survey" to work related to what the Germans would call *Vermessungs Kunde*. Why include geological and agricultural surveys, and omit statistical, ornithological, and botanical surveys, not to mention many others?

The geologist doubtless needs maps on which to exhibit some of the results of his geological explorations, but the science of geology and that of surveying can hardly be related by merely putting the words in juxtaposition. It must ever remain a thankless task to classify heterogeneous subjects whose kinship is due merely to the use of the word "survey" in a metaphorical or general sense, rather than in the precise and technical one in which it is used when applied to the second and third divisions.

But Mr. Baker does not uphold the classification he has offered any further than to maintain that it will answer his purpose quite as well as many others that could be made; and we might therefore let it pass had he not advanced a principle for its construction that would tend to endless difficulties should it be universally adopted.

That "surveys must be of various kinds, because they are made to serve various purposes: a classification of kinds is, then, a classification by purposes,"—I believe to be a fundamental error. Nor is it strengthened by the grouping into three great divisions,— "information," "boundary," and "improvement" surveys; or, as he expresses their equivalents, "general," "jurisdictional," and "construction" purposes; or the subsequent definition that "the general study of the earth is the object and purpose of information surveys." Strictly speaking, all surveys are for information, and therefore the three great divisions could with propriety be consolidated into one. It is only through the definition, "the study of the earth," that the "divisions" are plausible. Admit that a survey may be useful for many purposes, and they are no longer tenable. There are but few surveys of mensuration that have been instituted primarily for the purpose of acquiring information for "the study of the earth," while all contribute to this end. For many years past, since the art of surveying has been recognized as a science, surveys have been classed under designations that seem to me to admit of little improvement,—from "geodesy" we have "geodetic" (measurement of the earth); from "topography," "topographic" (measurement of the land areas); and from "hydrography," "hydrographic" (the water areas). All surveys of mensuration are included in these three, either directly or in combination with one another. A geodetic survey has a single purpose primarily, but it may also be the basis for all other surveys. Topographic and hydrographic surveys may be executed independently of the geodetic, or may be based upon it. They may also be conducted on the principle of the Coast Survey, based upon a triangulation not always of geodetic value. Such a work has frequently been designated a "trigonometrical survey," implying areas of land, water, or both, in which the distances and directions are controlled by a triangulation.

There is a second class of surveys that consist largely of explorations, such as geological, agricultural, botanical, magnetic, etc., that require surveys of mensuration in greater or less detail for their comprehensive elucidation. But the mensuration does not give them their value; and it is desirable, therefore, that they should not be classed with work of that description. Aside from the fact that they are so comprehensive, a classification by themselves seems essential.

Surveys of mensuration may be divided into many subordinate classes, but they do not necessarily lose their general distinctive char-

acter in the process of division. Surveys for railroads, canals, or any works of construction on the land, are still topographic surveys. For many works of construction, the surveys must be of the most detailed character, and their execution is topographic work of the highest order. A great deal of confusion has undoubtedly arisen from the inadvertent use of the word "topography," restricting it to a description of the irregularities or relief of the earth's surface. Originally it was used to describe the artificial or cultural features only; but as the science of surveying was developed, and the relief became an important feature of topographic work, by almost universal practice, it was defined to include both artificial and natural features. To restrict its meaning now to the relief features will drive out the only word we have that represents the "face of the earth and all there is upon it," and gives us nothing in its place. Would it not be better to adhere to "relief of the topography," or "orography," or even coin a new word, than part with "topography" in its comprehensive sense?

It may be, as Mr. Baker states, that the object and purpose of topographical surveys is the production of topographical maps; but it is far from conclusive when he defines a topographical map as one "with an accuracy and detail sufficient for all general purposes," and that such a map "is not made for any one specific purpose, any more than a jack-knife is." "General purposes" is a very catching expression, but very hard to define in a topographic sense; it is probably a near kin to "ordinary" in the classification, but surely neither of them should be acceptable in defining or classifying an exact science. If the comprehensive meaning of "topography" is the true one, the topographic survey will serve all purposes in which topography may have a value, whether they are of the alleged "general" nature, or specific. But such surveys are necessarily expensive, and they are only undertaken by those nations that have use for such detailed results. Mr. Baker produces a table showing the scale of publication adopted for the general maps of European countries, leaving the inference that the surveys are made with this scale of publication in view. Such is the case in some instances; but the exceptions go to prove the rule, that, where a knowledge of all the topography is valuable, the working scales are three to six times larger than the general publication scales. This is substantial evidence that the detailed knowledge of the topography has a far greater economic value than the general knowledge. If it were not so, the great expense of the large-scale surveys would not be incurred.

In the following table I have added to Mr. Baker's figures the scales on which the surveys are first mapped.

	Publication Scales.	Scale of Surveys.
India.....	1:253440	$\left\{ \begin{array}{l} 1:63360 \\ 1:15840 \\ 1:3960 \end{array} \right.$
Russia.....	1:126000	1:21000
Germany.....	1:100000	1:5000 to 1:25000
Norway.....	1:100000	1:25000 " 1:100000
Portugal.....	1:100000	1:50000 and larger
France.....	1:80000	1:10000 " 1:40000
Austria Hungary....	1:75000	1:25000 " 1:28800
England.....	1:63360	1:2500 " 1:10560
Sweden.....	1:50000 to 1:100000	1:10000 " 1:50000
Italy.....	1:50000	1:10000 to 1:50000
Spain.....	1:50000	Field notes
Denmark.....	$\left\{ \begin{array}{l} 1:40000 \\ 1:80000 \end{array} \right.$	1:20000
Switzerland.....	$\left\{ \begin{array}{l} 1:25000 \\ 1:50000 \end{array} \right.$	1:25000 and 1:50000
Belgium.....	$\left\{ \begin{array}{l} 1:20000 \\ 1:40000 \end{array} \right.$	1:20000

It is more instructive as now compiled, and shows among other things that the scale of a map depends upon the character of the subject, as well as the purpose for which it is constructed; and we thus see how a complete topographic survey will furnish maps for

any purpose, and that, as the scale of the original surveys is reduced, their value becomes less. In England the large scales have superseded the small scales, and even in India there is no scale for the surveys smaller than one inch to the mile. In France, as recently as 1878, surveys of the whole country, to be published on 1:10000, were recommended by a commission specially organized to consider the subject. In nearly all these countries it will be observed that surveys are plotted on scales about three inches to the mile, and some on scales much greater.

A map is understandingly designated by the purpose for which it was compiled, as each purpose may require the representation of different features and greater emphasis on special features; and if referring to the land, they are topographical maps, as they represent topographic features, though perhaps not all of them.

I believe Mr. Baker is also in error in designating hydrographic and physical surveys under the head of nautical surveys. The latter class of work has its own meaning, is understood as being less rigorous than measurements upon the land, as, indeed, must be the case from the nature of the operations and the methods necessarily employed in their execution. It is more nearly a branch of hydrographic surveying, and is usually classed there or as exploration, although it may embrace a margin of land in the survey. The maps produced by this method are generally intended for nautical purposes, and its use is confined almost exclusively to the ocean and definition of the coast-lines.

Physical hydrography develops forces as well as forms: it seeks a cause for an effect, and thus perfects a hydrographic survey. In the same sense a geological survey would be the perfection of the topographic. But while similar in conclusion, they are different in method; for in the hydrography we measure the forces now at work, while in geology we must deduce them, and can but estimate their power. I would therefore reverse Mr. Baker's classification, and designate nautical surveys and physical hydrography as subdivisions of hydrography.

The preceding discussion relates to the determination of facts as they now exist. But surveying as generally understood embraces also the opposite of this, or the marking on the ground of lines previously agreed upon; which marks may in turn become facts in future surveys. This class of work is generally connected with engineering operations; but it is also the character of boundary work, and the usual operations in mining surveys. In the case of a railroad or canal, it consists in locating upon the ground the line that has been determined upon, with its cuts, embankments, etc., as marked upon the drawings made from the topographical survey; in the case of a boundary, to locate a point or line on a given meridian or parallel, or to run a line in a certain direction from a given point, or both; and in mining, the location of a new shaft or heading, or any of the many operations connected with the engineering work of a mine. Mr. Baker has grouped this class of work into two divisions,—"boundary" and "construction" surveys. But, it will be observed, the work is all of the same character, and might therefore with perfect propriety be grouped in one class, under the term already well understood by surveyors and engineers,—"location."

We thus have three divisions—mensuration, exploration, and location—in which may be grouped different classes of work according to the nature of the operation, and which would usually be subdivided by the purpose for which the survey was made, or the method upon which it was conducted, and sometimes a combination of both. These subdivisions will readily suggest themselves, but would make too long a list for insertion.

In conclusion, permit me to add a few words on what Mr. Baker declares "a well-recognized principle, especially among engineers, that of two maps, or works of any kind, made for the same purpose, and serving that purpose equally well, that one is best which is cheapest." This implies, that, of two things exactly alike, the one that costs the least is the best. If they are alike, the price cannot affect their utility for the purpose for which they were designed, though one cost ten times the other. The cheapest would probably be most satisfactory to those who had to pay the bills; but, if both were the same price, there could be no choice for any reason. We may readily conceive, however, that if bids were offered to make two maps or works of any kind, that should serve a speci-

fied purpose equally well, the cheapest would be most favorably considered in the majority of cases; but, if the work was to be executed by two bodies of men of like skill and experience, we should have to conclude that one party was seeking an unusual profit, or that the other did not intend to live up to the contract, for it is inconceivable that two bodies of intelligent men, honest and experienced in their trade or profession, would execute a similar work with any great variation in the cost.

HERBERT G. OGDEN.

Washington, D.C., April 9.

English Examinations.

A SHORT time since, the public was greatly amused at a book containing a collection of ludicrous mistakes made by children in their examination-papers. Much merriment was excited by these poor little attempts at wisdom, and doubtless not a few persons laughed at the blunders of their own children, not perhaps understanding that some of this stupidity might have been inherited. Nor did the teachers who culled these blighted flowers seem to realize that many a thoughtful reader might be in doubt as to whether such evidence was intended to prove the incapacity of the children to learn, or the inability of the teachers to teach. Then human nature asserted itself in a cry of derision at the whole system of school education, and this was as manifestly uncalled for as the first outburst of cachinnation.

The method of examining college and university students is another serious matter that demands our attention. At the moment, the main agitation is in England. The recent expressions of opinion by eminent Englishmen as to the results and tendencies of the examination system there in vogue are appalling. There can be no doubt that the matter is one of grave importance. The examination system of England compels men to cram,—to become mere memorizers of facts, to substitute a hasty and temporary knowledge of these for reasoning, and to become learners of other men's ideas and discoveries to the exclusion of the ability to discover facts and create ideas for themselves. The result of this form of education is to make absorbers and not producers of knowledge,—as Shakspeare says,

"Small honor continual plodders ever won,
Save bare authority from others' books."

Such a condition is one of intellectual serfdom. The individual becomes dependent on others for advance in knowledge. His power to originate is not developed. He becomes a mere book, except that he costs more than a book, and is worth far less, less convenient to handle, less complete, and generally of far less use,—a kind of an old edition, lacking many pages, index, and author's name, badly bound, and full of omissions and errors.

The effects of the English examination system are readily seen in the many "cram" books that are published in that country, and which lack system and didactic worth. Most of them are professedly helps in preparing for examinations. The virus is also at work in this country, and earnest educators should lose no time in resisting its inroads. The result of this agitation is an outcry of the thoughtless against examinations of any kind. This, I think, is wrong. That bad effects are produced by certain kinds of examinations is very true; but that all examinations have therefore an evil tendency, I emphatically deny. So far, the consideration has not extended as thoroughly as it should to the nature of the examination from a didactic standpoint. That a certain class of examinations yield bad results, proves, not that all kinds of examinations are worthless, but that that particular kind of examination does not give satisfactory results. That may be because the examination is wrong in principle, because it is not the one called for by the work done, because it is imperfect, because it does not really show that the student knows any thing about the subject, nor because the examiner does not know how to examine. I venture to say that a considerable number of the teachers in colleges and universities, although men of undoubted learning and ability, and in many instances investigators of acknowledged reputation, do not pay much attention to the pedagogical side of their subjects, and, least of all, do not attempt to make a study of the principles and methods of examining. The science and art of examining are